

THAT WHICH IS CLAIMED:

1. A method of forming a composite article from composite fiber tape,
the method comprising:
5 irradiating at least one fiber tape with a laser diode array;
 compacting the irradiated fiber tape against a workpiece such that the
fiber tape conforms to the contour of the workpiece and is adhered thereto;
 inspecting the fiber tape and producing an output representative of at
least one characteristic of the fiber tape; and
10 automatically altering at least one system parameter defining an
operational characteristic of the method based on the output.
2. The method of forming a composite article of Claim 1 wherein
inspecting the fiber tape comprises inspecting images of the fiber tape after the
15 fiber tape has been compacted.
3. The method of forming a composite article of Claim 1 wherein
inspecting the fiber tape comprises measuring the molecular mobility of a
resin of the fiber tape.
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4. The method of forming a composite article of Claim 1 wherein
inspecting the fiber tape comprises detecting the tack of the resin of the fiber
tape before compacting the fiber tape against the workpiece, and wherein
automatically altering at least one system parameter comprises automatically
25 altering the temperature of the fiber tape before compacting the fiber tape
against the workpiece based on the tack of the resin of the fiber tape.
5. The method of forming a composite article of Claim 1 wherein
inspecting the fiber tape produces an output representative of at least one
30 characteristic of the fiber tape, the characteristics selected from the group
consisting of temperature of the fiber tape, temperature of the workpiece, rate
of placement of the fiber tape, compaction pressure, tack of the fiber tape, and
placement of the fiber tape relative to another fiber tape.

6. The method of forming a composite article of Claim 1 wherein automatically altering at least one of the system parameters comprises automatically altering at least one system parameter selected from the group consisting of temperature of the fiber tape, temperature of the workpiece, rate of placement of the fiber tape, compaction pressure, tack of the fiber tape, and placement of the fiber tape relative to another fiber tape.

7. The method of forming a composite article of Claim 1 further comprising:
measuring the temperature in a plurality of sensing zones on at least one of the fiber tape and the workpiece; and
automatically and independently irradiating a plurality of irradiation zones in accordance with the measured temperature.

8. The method of forming a composite article of Claim 1 further comprising marking an area of the fiber tape to indicate a defect based on the inspection of the fiber tape.